

Abstract

Monodisperse colloids were coated with polyelectrolytes using the layer-by-layer method. The template cores can remain in the interior or be dissolved away. Various fluorescent dyes are covalently bonded, in defined quantity, to the polyelectrolytes. The quantity of dye is controlled by varying the label content or by coprecipitating unlabeled polymers. Different dye layers are separated from each other by intermediate layers, resulting in unwanted interactions being suppressed. Conversely, a FRET signal can be generated between suitable dye pairs at short distances (0-6 nm), with it being possible to control this signal independently of the dye concentration by means of the number of intermediate layers. The capsule coding is read out by varying the excitation and emission wavelengths. Macromolecules which fish out complementary substances from solutions can be immobilized in the capsules.

Particles which are coated in this way, or hollow capsules, can be used as sensors after a sensitive intermediate layer has been introduced. Changes in the size/structure of the intermediate layer can be detected either by FRET occurring between adjacent, labeled polyelectrolyte layers or by self-quenching/aggregate fluorescence of dyes in the sensitive layer.

Figure 8.